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VACUUM CLEANER BAG DOCKING ASSEMBLY

TECHNICAL FIELD

The invention is directed to a bag docking assembly and, more particularly, to an assembly for docking a vacuum bag in the proper orientation for engagement with a dirty air outlet nozzle on a vacuum cleaner, and for retaining the vacuum bag in the position of engagement.

BACKGROUND OF THE INVENTION

Vacuum cleaners, such as upright vacuums, remove dirt from a carpet by creating a suction strong enough to draw the dirt particles from a section of the carpet up into the vacuum cleaner where the dirty air is passed through a vacuum bag in which the entrained dirt is captured. To increase the efficiency of this process, a base portion of the vacuum cleaner often has a roller brush for agitating dirt from the carpet as it is being vacuumed.

Inside the vacuum cleaner, a dirty air conduit transfers the dirty air from the base of the vacuum cleaner to the vacuum bag. The dirty air conduit runs up a handle assembly or, in cases where the dirty air conduit is rigid, the dirty air conduit can itself function as a portion of the handle. At the end of the dirty air conduit opposite the floor there is a dirty air outlet nozzle where the dirty air exits from the dirty air conduit. The vacuum bag is attached to the dirty air outlet nozzle.

The vacuum bag has a bag opening that fits closely over the dirty air outlet nozzle. The vacuum bag is otherwise a completely closed bag that is made from a porous material that allows air to flow through it, but which is too fine for most dirt particles to pass through. As dirty air passes through the vacuum bag, the air is forced through the porous material and the dirt is trapped in the bag. The bag thus collects the dirt from the dirty air and, more importantly, from the floor. Because the material of the vacuum bag is often fragile and can get very dusty, the vacuum bag is commonly held within a protective outer bag.

The outer bag is typically placed over the dirty air outlet nozzle first, with the dirty air outlet nozzle extending through a hole in the outer bag. A clip is then forced over the dirty air outlet nozzle between the outer bag and a protrusion on the outer surface of the dirty air outlet nozzle. The clip retains the outer bag in the proper position for use. Finally, the vacuum bag is placed over the remaining length of the dirty air outlet nozzle, and the outer bag closed.

To eliminate the need for emptying or cleaning the vacuum bag after it has collected dirt, vacuum bags have been modified over the years to be disposable. This allows the user to merely discard the dirty vacuum bag and replace it with a new, clean one. To adapt the vacuum bags for easy replacement, the bags have been designed so that the bag opening can be releasably engaged with the dirty air outlet nozzle.

One common vacuum bag design incorporates a reinforced area, known as a collar, surrounding the bag opening. The collar is usually a square or rectangular piece of thin cardboard. To install the vacuum bag, the user holds the collar by one or more edges, and forces the bag opening over the dirty air outlet nozzle. The collar can be designed with an elastic seal extending inward from the circumference of the bag opening to further seal the gap between the dirty air outlet nozzle and the bag opening.

Two primary problems exist with disposable vacuum bags. First, because the disposable vacuum bag is designed

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to be held within the outer bag, the dirty air outlet nozzle is often positioned deep within the outer bag and is hidden from sight. The user can initially look into the outer bag and see the dirty air outlet nozzle; however, when the vacuum

see the dirty air outlet nozzle; however, when the vacuum bag is partially positioned for engagement with the dirty air outlet nozzle, the vacuum bag interferes with whatever unobscured view the user had of the dirty air outlet nozzle. As a result, the vacuum bag must be installed entirely by feel. Installing a vacuum bag by feel increases the possibility that the bag opening will not be properly aligned with the dirty air outlet nozzle when the installer pushes the collar onto the vacuum cleaner. If the collar is not aligned properly, forcing the collar onto the dirty air outlet nozzle can bend or break the collar. A vacuum bag with a bent or broken collar is more likely to leak or disengage during operation.

Another problem associated with disposable vacuum bags is that the vacuum bag is not held firmly to the dirty air outlet nozzle. The collar is often held onto the dirty air outlet

nozzle by a small protrusion or a thin tab of cardboard. When the vacuum cleaner is turned on, the air rushing into the vacuum bag tends to urge the collar in a direction of disengagement from the dirty air outlet nozzle. As the vacuum bag fills, the pressure increases and, consequently, so does the force on the collar. If the collar is damaged during installation, or if the cardboard tab is not strong enough, the bag can disengage during operation, allowing dirty air to fill the outer bag. This results in the outer bag, which is not disposable, becoming soiled with dust and dirt.

Numerous different collar arrangements have been
30 designed to retain the collar over the dirty air outlet nozzle.
See, for example, U.S. Pat. No. 5,092,915 to Lackner; U.S.
Pat. No. 5,064,455 to Lackner; U.S. Pat. No. 5,464,460 to
Bosses; and U.S. Pat. No. 4,678,486 to Jacob et al. These
35 designs generally incorporate protrusions on the dirty air
outlet nozzle that engage with the collar. The interference
between the protrusions and the collar retains the collar on
the dirty air outlet nozzle. As with the traditional designs, if
the collar is damaged, the vacuum bag can still leak or
disengage from the dirty air outlet nozzle.

40 One invention, U.S. Pat. No. 5,688,298 to Bosses,
attempts to solve the problem of aligning the vacuum bag
with the dirty air outlet nozzle by adding an additional layer
on the surface of the collar. The additional layer has a large,
circular opening. The user can lightly press the face of the
45 collar against the dirty air outlet nozzle and move the collar
around until the dirty air outlet nozzle falls into the gap
created by the additional layer. This lets the user know that
the collar is in the proper position to be pressed against the
dirty air outlet nozzle. This design does not incorporate any
50 additional features to help retain the collar on the dirty air
outlet nozzle.

One attempted solution to the problems of both alignment and retention is discussed in U.S. Pat. No. 5,089,038 to Kopko et al. This invention is designed for use with a
55 vacuum cleaner having a rigid housing surrounding both the vacuum bag and the dirty air outlet nozzle. A hinge is integrally formed to the inside of the housing. A mounting plate holding the vacuum bag by its collar is attached to the hinge, and pivots to engage and disengage the vacuum bag.
60 from the dirty air outlet nozzle. The hinge is designed with positive stops to prevent the mounting plate from rotating too far. When the mounting plate is rotated to the point of engagement, the collar on the vacuum bag seals with the dirty air outlet nozzle. When the mounting plate is rotated to
65 the point of disengagement, a user accessing the unit from the back of the housing may remove the vacuum bag from the mounting plate and replace it with a new one.

One problem associated with the Kopko et al. invention is that it is limited to use on vacuum cleaners having rigid housings. Without a rigid housing, the invention does not provide or suggest any place to attach the hinge. Another problem is that the hinge is designed with positive stops at the rotational limits. The mounting plate is thus only free to rotate over a limited angle. This limits the number of orientations in which the invention may be applied.

A need therefore exists for an improved bag docking assembly for aligning a vacuum bag with a dirty air outlet nozzle, and for retaining the vacuum bag in the position of engagement.

SUMMARY OF THE INVENTION

It is therefore an object of this invention to provide an improved bag docking assembly for aligning a vacuum bag for engagement with a dirty air outlet nozzle on a vacuum cleaner, and for retaining the vacuum bag in the position of engagement. The invention also serves to retain an outer bag to the vacuum cleaner. The invention is directed to a vacuum cleaner bag docking assembly for use with vacuum cleaner bags of the type having a substantially rigid mounting collar surrounding the bag opening. The assembly incorporates an anchor member and a mounting member.

The anchor member serves to attach the bag docking assembly to the vacuum cleaner. The anchor member can be a substantially flat piece of plastic having a central opening for closely receiving the dirty air outlet nozzle on the vacuum cleaner. The central opening can have a shoulder for engaging a rim or similar protrusion formed about the perimeter of the dirty air outlet nozzle. One edge of the anchor member can have a first hinge member.

The mounting member can also be fabricated from a piece of flat plastic. The mounting member can have side walls, an end wall, and channels about a portion of its perimeter for engagement with the edges of the collar. The mounting member has a central opening corresponding to the location of the opening in the vacuum bag when the collar is engaged with the mounting member. One edge of the mounting member can have a second hinge member complementary to the first hinge member on the anchor member.

During operation, the anchor member can be slid over the dirty air outlet nozzle with the central opening in the anchor member closely fitting around the perimeter of the dirty air outlet nozzle. The edge having the hinge member is preferably oriented at the bottom. The resilient material of the anchor member is forced beyond a rim or similar protrusion on the dirty air outlet nozzle, and the rim holds the anchor member in place against the handle assembly of the vacuum cleaner.

The mounting member is pivotally connected to the anchor member by engagement of the first and second hinge members. The mounting member is free to rotate over an angle of approximately 180 degrees, from the point where the mounting member abuts the anchor member (the working position) to the point where the mounting member abuts the vacuum cleaner handle. At some point between the two angles, the mounting member is in a position that is convenient for the insertion and removal of the bag collar from the mounting member (the loading position).

When the mounting member is in the loading position, the bag collar can be inserted or removed from the mounting member while in plain view of the user. The edges of the bag collar slidably engage the channels in the mounting member and the channels retain the collar in the proper location and orientation to engage the dirty air outlet nozzle. When the

mounting member is rotated into the working position, the bag opening engages the dirty air outlet nozzle. Because the mounting member holds the collar in the proper orientation for engagement, the user does not need to align the bag with the dirty air outlet nozzle. The user can merely pivot the mounting member against the anchor member and thereby engage the bag with the dirty air outlet nozzle.

In another embodiment, the opening in the mounting member is adapted to closely receive the anchor member when the assembly is in the working position. A latch can retain the mounting member against the anchor member, thereby retaining the vacuum bag in the position of engagement with the dirty air outlet nozzle. The latch can be a resilient protrusion extending from the perimeter of the anchor member. When the mounting member is pivoted to engage the anchor member, the protrusion is forced through the opening and retains the assembly in the working position.

In yet another embodiment, the anchor member can have an entrance channel along one of its edges and a reduced neck portion between the entrance channel and the central opening. In this embodiment, the anchor member engages the dirty air outlet nozzle from a transverse direction, with the resilient neck portion distorting around the dirty air outlet nozzle. Once the dirty air outlet nozzle is engaged with the central opening, the neck returns to its original shape and retains the anchor member in place.

In still another embodiment, the side walls and end wall of the mounting member intersect at opposing corners. At least one of the corners is chamfered to have a portion thereof set off at an angle to both the side wall and end wall. The collar is fabricated with a complementary profile so that the user is assured that the collar is engaged with the mounting member in the proper orientation.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an isometric view of a vacuum cleaner incorporating a bag docking assembly according to one embodiment of the present invention.

FIG. 2 is an exploded isometric view of a vacuum cleaner bag and a vacuum cleaner incorporating a bag docking assembly according to one embodiment of the present invention.

FIG. 3 is an exploded isometric view of a bag docking assembly according to one embodiment of the present invention.

FIG. 4 is an isometric view of a bag docking assembly according to one embodiment of the present invention.

FIG. 5 is a partial section view as viewed along Section 5—5 of FIG. 3 of the anchor member of a bag docking assembly according to one embodiment of the present invention.

FIG. 6 is a partial section view as viewed along Section 6—6 of FIG. 3 of the mounting member of a bag docking assembly according to one embodiment of the present invention.

FIG. 7 is a partial section view as viewed along Section 7—7 of FIG. 3 of the mounting member of a bag docking assembly according to one embodiment of the present invention.

FIG. 8 is an isometric view of a vacuum bag collar according to another embodiment of the present invention.

FIG. 9 is an isometric view of a vacuum bag collar according to yet another embodiment of the present invention.

**DETAILED DESCRIPTION OF THE
INVENTION**

The present invention is directed toward a vacuum cleaner bag docking assembly for docking a vacuum cleaner bag in the proper orientation for engagement with a dirty air outlet nozzle on a vacuum cleaner, and for retaining the vacuum bag in the position of engagement. Many specific details of certain embodiments of the invention are set forth in the following description and in FIGS. 1-6 to provide a thorough understanding of such embodiments. One skilled in the art, however, will understand that the present invention may have additional embodiments, or that the invention may be practiced without several of the details described in the following description.

FIG. 1 shows a bag docking assembly 10 according to one embodiment of the present invention in a position of engagement with an upright vacuum cleaner 12. The vacuum cleaner 12 has a base 14 and a handle assembly 16. In this embodiment, a portion of the handle assembly 16 is a hollow tube serving as a dirty air conduit 18. The dirty air conduit 18 connects the base 14 with a dirty air outlet nozzle 20. The dirty air conduit 18 can also be independent of the handle assembly 16. The bag docking assembly 10 is preferably removably attached to the dirty air outlet nozzle 20. A protective, outer bag 22 can be positioned around both the dirty air outlet nozzle 20 and the bag docking assembly 10.

FIG. 2 shows an exploded view of a vacuum bag 24 positioned to engage the bag docking assembly 10, and the bag docking assembly 10 positioned to engage the dirty air outlet nozzle 20 on the vacuum cleaner 12. The vacuum bag 24 has a bag opening 26 through which dirty air enters the vacuum bag 24 for collection of entrained dirt. The bag opening 26 is surrounded by a reinforced collar 28. The bag opening 26 can also be surrounded by an elastic seal 30 to create a more air-tight seal when the vacuum bag 24 is engaged with the dirty air outlet nozzle 20. The vacuum bag 24 may also be designed to have a sliding panel 32 that slides between an opened position and a closed position over the bag opening 26 to prevent spillage when the vacuum bag 24 is disengaged from the vacuum cleaner 12. A retainer opening 34 is located on the sliding panel 32 to provide a grip for retaining the collar 28 and for moving the sliding panel 32.

The bag docking assembly 10 incorporates an anchor member 36 and a mounting member 38. The structure and operation of both the anchor member 36 and the mounting member 38 are discussed in detail below. Generally, the anchor member 36 retains the bag docking assembly 10 to the vacuum cleaner 12. The mounting member 38 is pivotally attached to the anchor member 36. The mounting member 38 pivots between a loading position, in which the collar 28 of the vacuum bag 24 may be engaged or disengaged with the mounting member 38, and a working position, in which the bag opening 26 engages the dirty air outlet nozzle 20.

FIGS. 3 and 4 best illustrate one embodiment of the bag docking assembly 10. The anchor member 36 preferably takes the form of a substantially flat member composed of resilient material, preferably plastic, that is molded to have a central opening 40 for engaging the dirty air outlet nozzle 20. The central opening 40 in the anchor member 36 is larger than the dirty air outlet nozzle 20 to allow the dirty air outlet nozzle 20 to pass through the central opening 40 in the anchor member 36. In one embodiment, a portion of the central opening 40 is adapted to have a shoulder 42. The shoulder 42 forms a recess which closely and captively

receives a complementary elevated portion on the dirty air outlet nozzle 20, such as a rim 43, a protrusion, or a flange.

In the preferred embodiment, the anchor member 36 is constructed to have an entrance channel 44 at one point about the perimeter of the anchor member 36 to allow the anchor member 36 to be inserted over the dirty air outlet nozzle 20 from a transverse direction. The entrance channel 44 is contiguous with the central opening 40 in the anchor member 36, and is separated from the central opening 40 by a reduced neck 46. The neck 46 is resilient enough to deform as it passes over the dirty air outlet nozzle 20 and return to its original shape once fully engaged. The neck 46 thus holds the anchor member 36 to the dirty air outlet nozzle 20.

To install the preferred embodiment, the anchor member 36 is first positioned adjacent the dirty air outlet nozzle 20 with the general plane of the anchor member 36 on the side of rim 43 closest to the handle assembly 16. The anchor member is slid in a direction transverse to the dirty air outlet nozzle 20 until the dirty air outlet nozzle 20 is completely engaged with the central opening 40. The anchor member 20 is then urged against the rim 43 until the recess in the shoulder 42 closely contacts the rim 43. The outer bag 22 can be interposed between the anchor member 20 and the handle assembly 16 to urge the anchor member 20 against the rim 43, or other biasing means can be substituted (FIG. 1).

In the preferred embodiment, the mounting member 38 is formed of a plastic that has been injection molded into a substantially planar body. The mounting member 38 is formed with an opening 52 that is positioned to correspond with the bag opening 26 when the collar 28 of the vacuum bag 24 is retained within the mounting member 38 in the proper position for engagement with the dirty air outlet nozzle 20 on the vacuum cleaner 12 (FIG. 2), as discussed in more detail below. In the preferred embodiment, the opening 52 in the mounting member 38 is large enough to engage the perimeter of the anchor member 36.

The mounting member 38 can be pivotally attached to the anchor member 36 by a hinge structure, such as a first hinge member 48 on the anchor member 36 and a second hinge member 58 on the mounting member 38. The mounting member 38 can rotate over an angle of up to 180 degrees between the point where it contacts the anchor member 36 and the point where it contacts the handle assembly 16. A latch mechanism, such as a protrusion 50 (FIG. 5) and a material receiving notch 56 (FIG. 7) can be utilized to retain the mounting member 38 against the anchor member 36, i.e., retain the mounting member 38 in a working position, as illustrated in FIG. 4.

Portions of the perimeter of the mounting member 38 can have one or more channels 54 for slidably receiving the edges of the collar 28 on the vacuum bag 24. The thickness of the channel 54 is slightly larger than the thickness of the collar 28 to allow the user to easily slide the collar 28 onto and off of the mounting member 38.

The perimeter of the mounting member 38 may also have a retainer member 60 (FIG. 6) that extends from the perimeter of the mounting member 38 toward the center of the opening 52. The retainer member 60 is positioned to engage the retainer opening 34 in the collar 28 of the vacuum bag 24.

In another embodiment, the mounting member 38 is shaped to receive a collar 28 having a chamfered corner 64. The collar 28 in this particular arrangement has two opposing side margins and an end margin connecting the two side margins (FIG. 8). One or both of the corners between the